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NARRATOR: This is a story of two worlds, one of highly sophisticated space technology, and another, thousands of miles away, where they still use a quill pen. Lloyd's of London carries most of the financial risk of those multimillion-dollar space shots when things go wrong.

This week on Enterprise, "Space Salvage."

Last February the crew of the space shuttle prepared to launch a communications satellite owned by Western Union. It was called West Star 6. It was insured for over \$100 million. At first, everything looked fine.

Crew member Bruce McCandless:

BRUCE MCCANDLESS: The deployment was flawless, and we were confident that everything had gone well. It wasn't until several hours later, when we got a query from the control center in Houston, that we began to realize that perhaps something had gone awry.

NARRATOR: Despite this, the second satellite, belonging to Indonesia, was launched three days later. It was insured for \$75 million. This time the shuttle crew decided to film the motor as it was fired.

MCCANDLESS: When the motor lit exactly 45 minutes later, we found that we had a little white light which we rapidly shuttered in the TV camera. We got a great big luminous smoke ring that expanded out. And we interpreted that as some sort of a failure in the nozzle.

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NARRATOR: The dot of light faded because the motor died. The fault lay in the black cone at the bottom of the motor. It apparently disintegrated. Instead of a very high circular orbit, both satellites were now in a useless elliptical orbit. They both function. But because they are in the wrong orbit, they can't do their job. They are so much space junk, with a total insurance liability of \$180 million, the greatest insurance loss in space.

With many underwriters at Lloyd's suffering losses, space insurance became a dirty word here. Lloyd's has now paid out twice as much money as it has received, with the lead underwriters taking a major loss.

Stephen Merritt has \$7 1/2 million at stake with Palopa B (?), the communications satellite that was to have been stationed over the islands of Indonesia. High above North America was the planned location of the other satellite, West Star 6. The lead underwriter of West Star is Richard Malum (?). His share of the insurance is \$3 million. But Malum's reaction to his losses was very different from Merritt's. Malum paid up.

RICHARD MALUM: As per our policy wordings and conditions, we paid in accordance with those conditions at the right and proper time. And the fact that Merritt hasn't paid has no effect on us at all.

NARRATOR: Stephen Merritt hasn't paid because he has a remarkable plan to do something that has never been done before. In fact, no one is even sure whether it's possible. He wants to stage a rescue in space.

STEPHEN MERRITT: What we intend to do is to get a shuttle up to a place in space where the satellite can be brought, the satellite then be loaded onto the shuttle, brought down, refurbished by Hughes, made in a condition where it's effectively as good as new, and then it can be relaunched, and the Indonesians will have their satellite in working order.

NARRATOR: The obstacles are formidable. First, he must persuade the Indonesians not to claim the insurance money, so he can use it to finance the rescue and start building a backup satellite in case the operation fails.

MERRITT: The Indonesians, according to the plan, if it works out, they will actually get a usable satellite in orbit about a year earlier than they could otherwise achieve it.

NARRATOR: Next, he must persuade NASA to use a shuttle to bring the satellite down. He'll appeal to the agency's self-interest.

NASA need to demonstrate how the shuttle can be used for recovery. Clearly, internationally, that will have political significance to them. They also want to demonstrate it to themselves, for their own confidence and so forth.

NARRATOR: Then, he must get Hughes Aircraft, the satellite manufacturer, to build special rescue equipment and fix the satellite once it's down. Merritt is ready with some convincing arguments.

MERRITT: Hughes -- two things. One is that it helps to protect their reputation. The other thing is that it would demonstrate that they are the best manufacturer of satellites and have the greatest care of their product. And I think that it has very considerable value to them as part of their general pride of the way they do business.

NARRATOR: Merritt's biggest hurdle will be his own colleagues, who will have to foot the bill if the rescue fails. But he's got an answer for them too.

MERRITT: If we do nothing now, then the satellite is a total loss and they have a full claim, under their policy. There's no question about that at all. If we can go through, in conjunction with the Indonesians and with NASA and Hughes, with this recovery exercise, then there's a very good chance that there will be some sort of saving. How many millions of dollars will actually be saved is anybody's guess. But it doesn't take many millions of dollars to be saved to make it worthwhile doing.

NARRATOR: It's an unusual gamble for people who have been gambling for 300 years. It was back in the 1680s that Edward Lloyd set up his coffeehouse in the City of London, where merchants and shipowners dabbled in insuring each other's cargoes as a business sideline. Lloyd's likes to remember that it's been around for a long time. In those days they met at coffeehouse tables with facing bench seats. That design is echoed in today's underwriter boxes. They've even kept the waiters, but their job now is to announce the brokers.

The general public isn't allowed on the floor of Lloyd's. If you want to insure something, first get yourself a broker. And then, whether its film-star legs or jumbo jets, the broker will approach the underwriter who specializes in that kind of risk.

Richard Malum doesn't just insure satellites. As an aviation underwriter, he spends most of his time insuring airplanes.

There are no committee decisions here. Each underwriter uses his own skill and judgment to decide whether he will accept

the risk. But when things go wrong, it's not only the underwriter who has to pay up. Most of the loss falls on their backers, who never come near Lloyd's.

Ken Hicks is one of them. He's a landowner in the South of England. To become a member of Lloyd's, he had to show personal wealth of at least \$130,000. His stake in Lloyd's brings him a comfortable income, but the potential risks are chilling.

KEN HICKS: If one's a member of Lloyd's, one's liable to lose absolutely everything that one possesses: your home, your farm, your cars, your clothes. You're liable right down to your last shirt button, not just the amount of money that you have invested in Lloyds, but absolutely everything.

NARRATOR: But it's unlikely that will happen. Ken Hicks' syndicate insured part of the \$100 million West Star satellite. But there are so many backers, that Hicks' share will only be \$100.

Once a year, Ken Hicks makes his way to the City of London for a special evening. He's in rich company. It's wealthy people like these who back Lloyd's insurance. Hicks' fellow diners are all members of a group of Lloyd's syndicates. They're a very cautious group. They pride themselves on having refused to insure the Titanic. And in the past 50 years, no member has lost a penny.

Tonight they've come to hear how well they're doing. Their aviation underwriter reports a profit, but just barely.

MAN: Ladies and gentlemen, good evening.

Nineteen eighty-two produced a series of losses in the market of such size and frequency that it was at year-end fairly described as the worst year ever for aviation insurers. These losses included Air Florida, Pan Am, Spantex, and two satellites.

At the end of 1983, we decided that we would not write any new space business until the rates rise. Unfortunately, this decision was not taken in time to avoid the West Star loss, but we did decline to underwrite the Indonesian Palopa satellite which failed to reach its correct orbit.

NARRATOR: But news of a possible rescue of the satellites has reached Ken Hicks.

HICKS: Mr. Broadsbridge (?), is Syndicate 959 likely to be asked to put up any more money for this recovery? And if the answer to this should be yes, are there real chances of a profit coming to the syndicate?

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MAN: The excitement of recovering the satellites is great. It's something we'd all like to be involved with. The reality of the situation, money, could mean that we finally elect not to attempt to recovery either of the satellites.

NARRATOR: For this syndicate, at least, space insurance has been deemed too risky. It is now getting much harder to insure any satellites, as the French are about to find out.

The European launcher Ariane, due to go up in July, has a new design with two booster rockets at the bottom. It has been thoroughly tested on the ground, but never in flight. And on its very first launch, it will carry a very expensive payload, two more satellites. The French Telecom satellite is inside the black container. On top of it is the ECS 2, which has already been insured at Lloyd's. Should the Ariane rocket fail, both satellites might well be lost, a risk which makes many underwriters reluctant to insure the Telecom.

Broker Chris Kevell (?) has been asked by the French to secure whatever insurance he can on the satellite. On May 15th he approaches Eddie Simms (?), a lead underwriter.

CHRIS KEVELL: We've got the Telecom business with us today.

NARRATOR: Simms had earlier insisted on a rate of 15 percent for the Telecom, the highest ever for a satellite. The French rejected it. But failing to get insurance elsewhere, they're now forced to accept it. The remaining question is what Simms's line will be. In other words, how much of the risk he'll be willing to underwrite.

KEVELL: What sort of line are you [unintelligible]?

EDDIE SIMMS: Well, we can only write ten million francs.

NARRATOR: Ten million francs isn't a bad start. But Chris Kevell would have liked more.

KEVELL: We're faced with a market that, after the Palopa and West Star mishaps at the beginning of the year, is slightly wary of the overall situation. And we also have a capacity problem.

NARRATOR: That capacity problem, the accumulated risk of two satellites on the same rocket, is Kevell's biggest headache.

He approaches Richard Malum, who got his fingers burnt

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on a West Star satellite.

KEVELL: What we've got, Richard, today is we've got the, I think, the first launch since the Palopa/West Star situation. This is the launch and the first 180 days, the initial in-orbit cover. We're talking about sums, in short, of 355 million. Eddie Simms has led it off, and we're talking about that as a rate.

MALUM: And what accumulation have we got?

KEVELL: You will accumulate on the first one with ECS 2.

MALUM: ECS 2, which we're on.

KEVELL: Which you're on. And we've got 48 million on that based in this market.

MALUM: Can we just check and see how much we've got on the S 2?

MAN: One and a half million dollars.

MALUM: We've got a very big line. Actually, I think, because of that, because this is an accumulation factor, we're not going to underwrite this one.

KEVELL: Richard, I think we're going to find that problem all the way around the market. So what I'd say to you is, look, please, can you write, say, a part of your line on ECS, because this is a very good write. Because of the Palopa situation, we've got better terms on this.

MALUM: First of all, I'm not greatly in love with Ariane as a launch vehicle.

KEVELL: This is a tried and tested satelllite. It is a derivative of the ACS, the European space satellite, which to date has been successful for you. What I'd like you to do is to, say, write us three-quarters of a million, half your line on the other one.

MALUM: Well, what you'd like me to do and what I'm actually going to do will be two different things. I'm afraid I'm fully accumulated, I've got a full line on ECS B. I don't want to write any more on this particular launch.

KEVELL: ...say that we can put down a half a million line.

MALUM: I cannot subject my names and my syndicate to a

line bigger than I feel we should write on this particular launch. And I think we've got the maximum line on the other satellite.

KEVELL: But you've got -- I mean your accumulation is purely on the launch vehicle, which is 18 minutes worth of exposure. The other 180 days, you've got no accumulation.

MALUM: What happened to the first two Ariane launchers?

KEVELL: They went, in short, for a considerable amount.

MALUM: What happened to them? What happened to them?

KEVELL: This is the L-10. This is the Ariane 3.

MALUM: Well, they've had a failure rate of two out of five, haven't they?

KEVELL: The whole space field's progressed, Richard.

MALUM: The thing is, it's not that we're totally against Ariane. We've written a line, we've written a line on this particular launch. And I'm not prepared to write any more of it.

KEVELL: Come on, you can write us half a million.

MALUM: You're a very good broker, Chris, but I'm afraid the answer is negative.

KEVELL: There is some way that you can put a line on this for us.

MALUM: No. I've got my full line on that particular launch. Thank you very much. So you'll have to seek [unintelligible] elsewhere.

KEVELL: Okay, Richard.

NARRATOR: Despite his best efforts, Kevell only manages to get 25 percent cover at Lloyd's.

With the growing disenchantment with space insurance, it might seem impossible for Stephen Merritt to launch his satellite rescue plan. But then the plan gets a boost from space itself. NASA demonstrates its ability to capture a satellite, the ailing Solar Max, and repair it in space. Merritt is quick to exploit NASA's success.

DELBERT SMITH: What we have for you here today are a

series of film clips of the actual Solar Max recovery itself.

NARRATOR: Delbert Smith, Merritt's American lawyer, has come to London to promote the rescue of Palopa B with the underwriters.

SMITH: The Solar Max was the beginning of what we're talking about today, and that is the much easier, the much more technologically simpler task of the recovery of a straightforward, simple satellite.

NARRATOR: After the meeting, Stephen Merritt has what he needs.

MERRITT: Their reaction was a certain amount of surprise, a certain amount of confusion. But at the end, there was almost complete unanimity to go ahead with it.

NARRATOR: The underwriters have approved the plan, but only on the condition that he gets an acceptable price from NASA and Hughes. They, in turn, suggest that it would be cheaper to rescue both Palopa and West Star. Hughes wants \$2.5 million for one satellite and five million for two. And NASA wants 4.7 million for one and 5.5 for two, making a total rescue price of \$7.2 million for one satellite or 10.5 million for both.

The potential reward to the underwriters might be as high as \$30 million for one satellite and 60 million for two. In other words, they must risk \$10.5 million to make 60.

Stephen Merritt wants to go ahead, and asks broker John Howes to persuade the other underwriters to put up the \$10 1/2 million, which they would lose if the rescue fails.

MAN: I'm not too sure I want to see you. You always cost me money when you come in.

HOWES: This is the recovery sheet that we're going to put on the market for the B2 satellite.

MAN: These seem rather more reasonable than the ones that were being mooted recently.

HOWES: Yes, I think they are, because I think it's --they are the double pickup, for West Star 6 as well.

MAN: So fishing for two is cheaper than fishing for one, really.

HOWES: That's right.

MAN: Okay. I said you always cost me money when you come in.

Thank you for all the work you've done in the matter. I know it's been a long uphill slope for you.

HOWES: I just hope it works.

NARRATOR: Elsewhere, John Howes meets more resistance.

MAN: I've been into all this with Mr. Merritt, but can you tell me how many underwriters have agreed to this and how many have disagreed?

HOWES: At the present time, we're going around the market. As you see, there are a number of initials there.

MAN: There're not many, are there?

HOWES: No, but there are three photostats in the market being taken around by my colleagues, and it is being agreed to. I think at the end of the day you're probably going to come up with something like an 85 percent agreement.

MAN: And what happens to the other 15 percent?

HOWES: That is going to be referred back to certain underwriters who feel that they could take more of this.

MAN: And who are the underwriters who are going to take the additional gamble?

HOWES: I don't know yet.

MAN: You don't know yet.

HOWES: No. Some of -- I think Mr. Merritt is prepared to take some of it.

NARRATOR: Stephen Merritt can only pick up so much himself, so he'll have to get as many underwriters as possible to go along with him.

MAN: I see. Well, we've had various meetings on this, and I certainly to follow Stephen Merritt on this. I just initial it?

HOWES: Yes. Thank you very much.

MAN: And keep our fingers crossed. I've never written a satellite in my life, and of course...

HOWES: You've inherited it.

MAN: I've inherited it. Yes.

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NARRATOR: With the underwriters beginning to go along with the plan, Merritt pays a visit to NASA Headquarters in Washington.

MERRITT: ...express our thanks to NASA for enabling us to...

NARRATOR: He's here to brief the Indonesians on the preparations for the rescue.

MERRITT: We shall, after lunch, get down to discussing the basic sense and possibilities of...

NARRATOR: But as he talks, it becomes apparent that the Indonesians have an entirely different agenda. They just want their money, and aren't interested in his schemes. Merritt's group will have to go it alone.

Back in London, there's another problem. If the West Star is rescued, Richard Malum says his group will have a claim on the money.

MALUM: Well, we have rights of recovery because under the policy we have with Western Union, if the satellite is recovered and relaunched, we have entitlement of 50 percent of the revenue if it is relaunched successfully. This is what the discussion is about with Steve in America at the moment.

NARRATOR: Merritt, determined to beat back the challenge, calls a meeting. All the underwriters who lost money on the two satellites have been invited to attend. Richard Malum could conceivably block the entire venture.

MALUM: If no agreement is reached, I doubt whether they can go ahead with the recovery of those two satellites, 'cause Western Union, the owner of West Star 6, are not prepared to release title of ownership to anybody unless there is agreement between the two sets of insurers.

NARRATOR: The two leads put their respective cases. Richard Malum argues that all those who lost money on the West Star should have a share of any income arising from its rescue. Stephen Merritt, who had insured the revenue of the satellite, argues that the small print gives him and his colleagues a prior claim.

Twenty minutes later, Stephen Merritt leaves the meeting.

MERRITT Well, we've left the Western Union primary underwriters to discuss amongst themselves what their position

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is. But broadly speaking, we were encouraged by the enthusiastic support, if you can call silence enthusiastic support.

NARRATOR: Richard Malum is forced to concede, as Merritt holds firm.

MALUM: The only way this matter would have been solved would be in the courts. And quite frankly, we did not wish to go to court with another Lloyd's underwriter on a matter such as this. We thought it would be bad for Lloyd's. And quite frankly, we did not want to be seen to be stopping an idea of recovering these satellites.

NARRATOR: The rescue is on. And by August, Merritt is at Hughes Aircraft in California. Having obtained title to both satellites, he's here to represent the new owners, the underwriters of Lloyd's, to see how their money is being spent.

MERRITT: Will one side of the satellite be much hotter than the other, or would it have been spinning sufficiently?

MAN: There may be as much as a 100-degree gradient between the two vehicles. And we will actually apply heaters to one or the other.

NARRATOR: Hughes is building new equipment to hold the satellites as they're brought down to earth on board the shuttle. It's never been done before. And the equipment doesn't come cheap. This piece alone costs \$200,000.

By late August, another obstacle is overcome. After a delay of two months, the shuttle Discovery, which NASA will use for the rescue, finally manages to get off the ground for its inaugural flight. It carries three satellites, insured for a total of \$240 million. All are launched successfully, much to the relief of the underwriters.

The rescue is now scheduled for November. The plan is to use the remote manipulator arm of the shuttle to grab the satellites. But Palopa and West Star weren't designed to be rescued, so there's nothing for the arm to grab. This is where the astronauts come in, using a specially designed device.

Astronaut Dale Gardner explains.

DALE GARDNER: We call it an AKM capture device. The common name that we call it is a Stinger. It's a long probe that sticks out in front of the MMU, and it's much like a mollie bolt, a bolt that you can put through a wall, and it has three fingers or two fingers that then pop on springs, such as you can then pull it back with threads and attach something to the wall.

We're going to do that same thing with the Stinger. The point that we're going to attack on the spacecraft is the rocket nozzle, that has since been fired.

NARRATOR: NASA has been training the astronauts for months. Dale Gardner and Joe Allen will both have to go out and grab the satellites. So they've been practicing the procedure in a water tank at Houston.

The Lloyd's underwriters are paying for it all: the cost of training, the development of the equipment, as well as a share of the launching costs.

Merritt's in Houston to see a model of the capture device.

MAN: In reality, he'll be in a position about like so, with his hands in this area with the hand controllers. So he'll be flying, looking like down the point of the probe across this cross-member here. And when he gets the probe in, just as he's about ready to touch the spacecraft, he'll pull this lever back. These toggles spring out, and then you couple -- soft-dock, if you will -- between the Stinger and the spacecraft. So it can't get loose, even though it might, you know, rattle around a little bit. You've got it captured.

NARRATOR: Later, Merritt gets a tour of Mission Control at the Johnson Space Center, where he'll be during the rescue.

MAN: The flight controllers control the shuttle vehicle. We have the flight director's console, and he's in charge of the entire operation. This is our customer support room, where you'll be located during the flight. We have in here all of the communications and displays that you'll need to observe the operations. And if you are here for the launch, this is typical of the place you would be sitting. As a matter of fact, you might be at this table. And it provides you with all of the communications that you need to follow the progress of the flight.

NARRATOR: It has been a long haul for Merritt. In an effort to minimize his losses, he's moved from underwriting at Lloyd's into the riskier business of space salvage.

MERRITT: Well, somewhat reluctantly, I think. We would have preferred not to have got into this position. But seeing as we're in it, we're reasonably happy.

NARRATOR: As the shuttle prepares for takeoff, Merritt could only wait and hope. Will he and his colleagues save \$60 million or will they lose another 10?

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MERRITT: I'm very optimistic. I don't think anybody can be totally confident, as nothing approaching it has been done before. But I'm very optimistic that we shall have a successful outcome.

NARRATOR: The moment of truth will come in two weeks, during Discovery's next scheduled flight. The rescue of the satellites will probably be televised. You can be sure Lloyd's of London will be watching.